



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,679	12/17/2003	Hideko Inoue	740756-2689	4095
22204 7590 02/21/2007 NIXON PEABODY, LLP 401 9TH STREET, NW SUITE 900 WASHINGTON, DC 20004-2128			EXAMINER YAMNITZKY, MARIE ROSE	
			ART UNIT	PAPER NUMBER
			1774	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/21/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/736,679

Applicant(s)

INOUE ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 11-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-32, 36, 37, 41, 42, 49 and 50 is/are allowed.
- 6) ☒ Claim(s) 1-3, 11-22, 33-35, 38-40, 46-48 and 51-56 is/are rejected.
- 7) ☒ Claim(s) 43-45 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. This Office action is in response to applicant's amendment filed November 30, 2006, which amends claims 1, 11, 17, 23, 28, 34-37 and 39-42, and adds claims 43-56.

Claims 1-3 and 11-56 are pending.

2. The rejection of claims 34-37 and 39-42 under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, as set forth in the Office action mailed August 30, 2006 is overcome by applicant's amendment.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 11-16, 33, 34, 38, 39, 46, 47 and 51-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 2002/0034656 A1).

See the entire published application of Thompson et al. In particular, see Fig. 11, Fig. 49, paragraphs [0052], [0058]-[0059], [0169]-[0173], [0177]-[0180] and [0183]. Thompson et al. suggest iridium compounds of general formula 2 as defined in present claims 1 and 51, and further defined in present claims 2, 3, 52 and 53.

With respect to present claims 11-16, Thompson et al. disclose the iridium compounds for use as a light emitter in an organic light emitting device (OLED) having the structure set forth in independent claim 11.

Further with respect to claim 14, the OLED may be incorporated into various articles as taught, e.g., in paragraph [0051].

Further with respect to claims 15 and 16, Thompson et al. teach that a hole-transporting layer may be included in the device structure, and may be made of known hole-transporting materials. The material represented by the formula in paragraph [0177] meets the limitations of a low molecular weight material as required by claim 16. Polyvinylcarbazoles, which are taught in paragraph [0180] as hole-transporting and are known in the art as suitable for hole transporting layers, meet the limitations of a polymer material as required by claim 15. A hole transporting layer made of the material represented by the formula in paragraph [0177] or made of a polyvinylcarbazole will inherently provide a hole injection function.

Thompson et al. disclose compounds of formula  $L_2MX$  where L may be a phenylimine, and X may be monoanionic ligand such as acetylacetonate (a ligand of present formula 3), picolinate (a ligand of present formula 5), salicylanilide (a ligand similar to the ligand of present formula 7, differing only in having  $=NCH_3$  instead of  $=NH$ ), salicylaldehyde (a ligand of present formula 8), or 8-hydroxyquinolate (a ligand of present formula 9).

Thompson et al. do not disclose a specific example of a compound within the scope of the present claims, but such compounds are clearly suggested by Thompson's disclosure. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds of formula  $L_2MX$  utilizing the L and X ligands taught by Thompson et al. in order to provide a variety of compounds suitable for use in an EL device as taught by the prior art. One of ordinary skill in the art at the time of the invention would have

reasonably expected that iridium compounds of formula  $L_2MX$  having the L and X ligands taught by Thompson et al. would be luminescent materials and would be suitable for use in the luminescent layer of an organic EL device.

In the phenylimine formula shown in Thompson's Fig. 49, R corresponds to present  $R_1$ , and  $R'$  corresponds to present  $R_3$ - $R_6$ . Thompson et al. do not explicitly define R and  $R'$  for the phenylimine formula shown in Fig. 49 but, based on Thompson's disclosure as a whole and paragraphs [0169]-[0173] in particular, one of ordinary skill in the art at the time of the invention would have reasonably expected at least alkyl and substituted or unsubstituted aryl groups to be suitable substituents since Thompson et al. disclose alkyl and aryl substituents as suitable for other luminescent compounds within Thompson's disclosure. Further, the phenylimine formula shown in Thompson's Fig. 49 does not show a substituent at the position corresponding to present  $R_2$  but, based on paragraphs [0172]-[0173] in particular, one of ordinary skill in the art at the time of the invention would have reasonably expected that phenylimine ligands having an alkyl or substituted or unsubstituted aryl group at this position instead of hydrogen could be used to make Thompson's compounds of formula  $L_2MX$ .

With respect to present claims 33, 34, 38, 39, 46, 47 and 54-56, compounds suggested by Thompson et al. that are within the scope of organometallic complexes of present general formula 2 will inherently have the emission characteristics of those complexes.

5. Claims 17-22, 35, 40 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 2002/0034656 A1) as applied to claims 1-3, 11-16, 33, 34, 38, 39, 46,

47 and 51-56 above, and further in view of Yamazaki et al. (US 2001/0050373 A1) or Kamatani et al. (US 2003/0059646 A1).

Thompson et al. teach that the OLED may be incorporated into various articles as taught, e.g., in paragraph [0051]. Thompson et al. do not explicitly disclose the structure required for the device of independent claim 17 and claims dependent therefrom, which includes a thin film transistor (TFT), an interlayer insulating film over the TFT, and first electrode over the interlayer insulating film and electrically connected to the TFT.

A light emitting display device comprising an EL device electrically connected to a TFT through an insulating film was known in the art at the time of the invention.

Yamazaki et al. and Kamatani et al. disclose active matrix light emitting display devices comprising an EL device (OLED) having an electrode electrically connected to a TFT through an interlayer insulating film. In Yamazaki's published application, see Fig. 15 and paragraphs [0126]-[0135], for example. In Kamatani's published application, see Fig. 6 and paragraphs [0201]-[0206], for example.

It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to use Thompson's OLED to make an active matrix light emitting display device of a structure known in the art such as the structure taught by Yamazaki et al. or Kamatani et al.

With respect to present claims 35, 40 and 48, compounds suggested by Thompson et al. that are within the scope of organometallic complexes of present general formula 2 will inherently have the emission characteristics of those complexes.

Art Unit: 1774

6. Applicant's arguments filed November 30, 2006 have been fully considered but they are not persuasive with respect to the patentability of the claims as rejected in this Office action.

Reference to *Grant & Hackh's Chemical Dictionary* has been removed from the rejections since the claims no longer limit  $R_1$  to a phenyl group.

Applicant argues that by having an electron donating group such as an alkyl group at  $R_2$  of present formula 2 instead of hydrogen, the organometallic complex can emit both fluorescence and phosphorescence.

Applicant further argues that the formula shown in paragraph [0172] of Thompson et al. is a complex of formula  $L_3M$  rather than a complex of formula  $L_2MX$ , and Thompson et al. do not disclose or suggest the use of organometallic complexes that emit both fluorescence and phosphorescence. Applicant argues that therefore there is no motivation to combine the formula shown in paragraph [0172] with Thompson's compounds of formula  $L_2MX$ .

Given Thompson's teachings as a whole, one of ordinary skill in the art at the time of the invention would have reasonably expected that ligands suitable for L of complexes of formula  $L_3M$  would also be suitable for L of complexes of formula  $L_2MX$ .

The definition of  $R_2$  as set forth in the rejected claims encompasses both electron donating groups and electron accepting groups. Thompson et al. teach that substituents for the light-emissive organometallic complexes may be selected from electron donors and electron acceptors (e.g. see paragraph [0048]). Thompson et al. specifically teach that alkyl and aryl groups may be used as substituents for light-emissive organometallic complexes. (Unless

Art Unit: 1774

specifically modified by the term “substituted” or “unsubstituted”, the examiner interprets the phrase “aryl group” to encompass substituted, as well as unsubstituted, aryl groups.)

The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

7. Claims 23-32, 36, 37, 41, 42, 49 and 50 are allowed.

8. Claims 43-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Applicant’s amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



Art Unit: 1774

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY

February 16, 2007



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774